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A Campaign of Scientific Drilling for Monsoon Exploration in the Asian Marginal Seas

Peter Clift¹, Christian Betzler², Steven Clemens³, Beth Christensen⁴, Gregor Eberli⁵, Christian France-Lanord⁶, Stephen Gallagher⁷, Ann Holbourn⁸, Wolfgang Kuhnt⁸, Richard Murray⁹, Yair Rosenthal¹⁰, Ryuji Tada¹¹, and Shiming Wan¹²

¹Department of Geology and Geophysics, Louisiana State University, Baton Rouge, LA 70803, USA

²Institute for Geology, German Research Fleet Coordination Center, University of Hamburg, Bundesstrasse 55, 20146 Hamburg

³Department of Earth, Environmental and Planetary Sciences, Box 1846 Brown University, Providence, RI., 02912-1846, USA

⁴Department of Environmental Science, Rowan University, 201 Mullica Hill Road, Glassboro, NJ 08028, USA

⁵Center for Carbonate Research, University of Miami, 4600 Rickenbacker Causeway, Miami, FL 33149, USA

⁶Centre de Recherches Pétrographiques et Géochimiques, Université de Nancy, CNRS UMR 7358, F-54500, Vandoeuvre-lès-Nancy, France

⁷School of Earth Sciences, The University of Melbourne, Victoria, 3010, Australia

⁸Institute of Geosciences, Christian-Albrechts-University, Olshausenstrasse 40, D-24118 Kiel, Germany

⁹Woods Hole Oceanographic Institution, Woods Hole, MA 02543, USA

¹⁰Department of Marine and Coastal Sciences, Rutgers, The State University of New Jersey, 71 Dudley Road, New Brunswick, NJ 08901-8520, USA

¹¹Department of Earth and Planetary Science, The University of Tokyo, 7-3-1 Hongo, Bunkyo-Ku, Tokyo, 113-0033, Japan

¹²Key Laboratory of Marine Geology and Environment, Institute of Oceanology, Chinese Academy of Sciences, 7 Nanhai Road, Qingdao, Shandong Province, 266071, China

International Ocean Discovery Program (IODP) conducted a series of expeditions between 2014 and 2016 that were designed to address the development of monsoon climate systems in Asia and Australia. Significant progress was made in recovering Neogene sections spanning the region from the Arabian Sea to the Japan Sea and south to western Australia. High recovery by advanced piston core (APC) technology has provided a host of semi-continuous sections that have been used to examine monsoonal evolution. Use of half APC was successful in sampling sand-rich sediment in Indian Ocean submarine fans. The records show that humidity and seasonality developed diachronously across the region, although most regions show drying since the middle Miocene and especially since ~4 Ma, likely linked to global cooling. The transition from C3 to C4 vegetation often accompanied the drying, but may be more linked to global cooling. Western Australia, and possibly southern China diverge from the general trend in becoming wetter during the late Miocene, with the Australian monsoon being more affected by the Indonesian Throughflow, while the Asian Monsoon is tied more to the rising Himalaya in South Asia and to the Tibetan Plateau in East Asia. The monsoon shows sensitivity to orbital forcing, with many regions having a weaker summer monsoon during times of Northern Hemispheric Glaciation. Stronger monsoons are associated with faster continental erosion, but not weathering intensity, which either shows no

trend or decreasing strength since the middle Miocene in Asia. Marine productivity proxies and terrestrial environmental proxies are often seen to diverge. Future work on the almost unknown Paleogene is highlighted, as well as the potential of carbonate platforms as archives of paleoceanographic conditions.